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The effect of mineral radon water applied in the form of full baths on blood pressure in patients with hypertension

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ABSTRACT

Introduction: Due to patients' safety, increased blood pressure often restricts wider use of mineral water for therapeutic purposes in rehabilitation practice. The aim of this study was to examine the effect of radon mineral water applied in the form of full baths on blood pressure in people with hypertension.

Methods: A total of 27 patients, average age 58.10 years with hypertension were included in the study. Balneotherapy was applied in the form of full baths with mineral radon water of neutral temperature. Values of systolic and diastolic blood pressure were measured before and after twenty minutes therapy on the first and fifth day of treatment.

Results: On the first day of treatment there was no significant change in blood pressure after the application of full baths with mineral radon water of neutral temperature (systolic pressure t = 0.697, not significant; diastolic pressure t = 0.505, not significant). On the fifth day of treatment there was no significant changes in blood pressure after the application of medical baths with mineral radon water of neutral temperature (systolic pressure t = 1.372, not significant; diastolic pressure t = 1.372, not significant).

Conclusion: The significant increase of blood pressure in patients with mild and moderate hypertension is not expected when Fojnica water (radioactive mineral water) is being used in the form of full baths of neutral temperature, which allows a broader application of this balneo procedure in rehabilitation practice.

Keywords: blood pressure, mineral radon water

INTRODUCTION

Winternitz (internist, 1835-1917) defined the term hydrotherapy as the use of water of different temperatures and aggregate states in dietetic, prophylactic and therapeutic purposes. This definition is still applicable (1). Mineral waters are generally defined as waters with a total dissolved solid content of at least 1g per liter or waters which have a temperature higher than 20° C or contain small amounts of substances with strong physiological influence (2).

Water of Fojnica spa is an oligomineral, calcium, sodium sulphate hydrocarbonate, radon (radioactive) homoeothermic (3). Radon water is the natural groundwater, with not so deep circulation, which contains less than 50 Bq / l of 222 Rn. Radioactive

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TABLE 1. Blood pressure values before and after the treatment in the full bath of neutral temperature - the first day of treatment

Parameters	T °C	Average value X Standard deviation SD	Before the treatment a	After the treatment b	Difference d = b-a	T test
Systolic blood pressure	35-36	X SD	145.0 12.7	145.4 24.9	0.4 20.3	t = 0,697 not significant
Diastolic blood pressure	35-36	X SD	83.7 9.81	85.0 12.58	1.3 8.19	t =0,505 not significant

water acts as an analgesic, anti-inflammatory and provides neuro - vegetative balance (4-7).

Mineral radon water is used in the treatment and rehabilitation of chronic inflammatory and degenerative rheumatic diseases, neurological diseases, cardiovascular diseases, allergic disorders, gynecological disorders, endocrine and vegetative disorders (1, 3, 6, 8-11).

Increased blood pressure in medical rehabilitation practice often limits the use of water for therapeutic purposes.

The aim of this study is to examine the effect of radon mineral water applied in the form of full baths on blood pressure in people with hypertension.

METHODS

Total of 27 patients (10 men and 17 women) with diagnosed hypertension were included in this prospective study. The average age of patients was 58.10 years. We included mild hypertension patients with systolic blood pressure 140-159 mmHg or diastolic blood pressure 90-99 mm Hg; and moderate hypertension patients with systolic blood pressure 160-179 mmHg or diastolic blood pressure 100–109 mmHg). All of them were regularly using antihypertensive pharmacological therapy and blood pressure was under control.

The patients with severe hypertension i.e. systolic blood pressure ≥180 mm Hg or diastolic blood pressure ≥110 mmHg, and those in which balneotherapy was contraindicated were not included into this study.

Testing was performed at the Medical rehabilitation centre "Fojnica". Balneotherapy was applied in the form of full baths with mineral radon water. The temperature of water was 35 -36 ^{0} C. Treatment was applied once per day, in the form of twenty minutes baths (one procedure per day). The values of systolic and diastolic blood pressure were measured before and after balneotherapy procedure on the first and fifth day of treatment.

Riva-Rocci sphygmomanometer was used to measure arterial blood pressure on the upper arm. The blood pressure is specified in millimetres of mercury (mmHg).

Statistical processing and analysis of data was conducted. The difference in results was tested by using appropriate tests of statistical significance of differences (t-test).

RESULTS

The study included 27 patients (10 men and 17 women) with mild et moderate hypertension.

The average age of patients was 58.10 years.

On the first day of treatment there was no significant change in blood pressure after the application of full baths with radon mineral water of neutral temperature.

On the fifth day of treatment there was no significant change in blood pressure after the application of full baths with radon mineral water of neutral temperature.

DISCUSSION

Twenty seven patients (10 men and 17 women, average age of 58.10 years) with mild and moderate hypertension were included in this prospective study. The objective of the study was to examine the effect of radon mineral water applied in the form of full baths on blood pressure in people with hypertension.

The research results show that the use of full baths of neutral temperature does not result in statistically significant increase of blood pressure (measured before and after treatment, on the first and fifth day of

TABLE 2. Blood pressure values before and after the treatment in the full bath of neutral temperature - the fifth day of treatment

Parameters	T °C	Average value X Standard deviation SD	Before the treatment a	After the treatment b	Difference d = b-a	T test
Systolic blood pressure	35-36	X SD	121.0 12.0	125.0 10.0	4.0 5.83	t = 1.372 not significant
Diastolic blood pressure	35-36	X SD	79.0 4.84	75.0 6.32	-4.0 5.8	t = 1.372 not significant

treatment), which allows a wider application of this hydro procedure in terms of patient safety. Some other researches indicated positive effects of balneotherapy on blood pressure. Results of Zunnunov ZR research showed that systolic and diastolic blood pressure after using hydrogen sulphide bath has significantly decreased (12). Ekmekcioglu C. et al. found that patients with secondary, especially with high systolic blood pressure have benefit from balneotherapy (13). Oláh M. et al. research confirms that balneotherapy is not contraindicated in patients with hypertension (14). Significant changes in heart rhythm and autonomic regulation are not registered in patients with mild to moderate hypertension after administration of sodium chloride bath (15). In the study Korchinskii VS. hypotensive effect of radon baths was determined (16).

During the examination of the radon baths effect on the lipid profile of patients with cardiovascular disease and dyslipidemia, the desired level of blood pressure was clinically achieved in 77.2% of patients (17).

In our study it was found that the application of mineral radon water in the form of full baths with neutral temperature is not contraindicated in patients with mild and moderate hypertension.

CONCLUSION

The significant increase of blood pressure in patients with mild and moderate hypertension of is not expected when using mineral radon water of Fojnica spa in the form of full baths of neutral temperature, which allows a wider application of this balneo procedure in rehabilitation practice.

COMPETING INTERESTS

The authors declare no conflict of interests.

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